

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Hironori KOBAYASHI et al.

Prior

Group Art Unit: 1756

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Examiner: John A. McPherson

For: STRUCTURE FOR PATTERN FORMATION, METHOD FOR PATTERN  
FORMATION, AND APPLICATION THEREOF

PRELIMINARY AMENDMENT

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application,  
please enter the following changes:

IN THE CLAIMS:

Cancel claims 1 to 81 without prejudice or disclaimer and  
substitute therefor the following new claims:

82. (New) A structure for pattern formation adapted for optically forming a pattern, comprising a photocatalyst-containing layer provided on a substrate, the photocatalyst-containing layer containing a silicone compound, an organic group bonded to a silicon atom of the silicone compound capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

83. (New) A structure for pattern formation adapted for optically forming a pattern, comprising: a substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a silicone compound, an organic group bonded to a silicon atom of the silicone compound capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

84. (New) A structure for pattern formation adapted for optically forming a pattern, comprising a composition layer, the composition layer comprising a photocatalyst, a material

decomposable through photocatalytic action upon pattern-wise exposure, and a binder.

85. (New) The structure for pattern formation according to claim 82, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

86. (New) The structure for pattern formation according to claim 82, characterized in that the silicone has been prepared from a composition containing an organoalkoxysilane.

87. (New) The structure for pattern formation according to claim 85, characterized in that the silicone has been prepared from a composition containing an organoalkoxysilane.

88. (New) The structure for pattern formation according to claim 82, characterized in that the silicone has been prepared from a composition containing a reactive silicone compound.

89. (New) The structure for pattern formation according to claim 85, characterized in that the silicone has been prepared from a composition containing a reactive silicone compound.

90. (New) The structure for pattern formation according to claim 83, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

91. (New) The structure for pattern formation according to claim 83, characterized in that the silicone has been prepared from a composition containing an organoalkoxysilane.

92. (New) The structure for pattern formation according to claim 90, characterized in that the silicone has been prepared from a composition containing an organoalkoxysilane.

93. (New) The structure for pattern formation according to claim 83, characterized in that the silicone has been prepared from a composition containing a reactive silicone compound.

94. (New) The structure for pattern formation according to claim 90, characterized in that the silicone has been prepared from a composition containing a reactive silicone compound.

95. (New) The structure for pattern formation according to claim 82, characterized in that the pattern forming structure is an original plate for a printing plate.

96. (New) A method for pattern formation adapted for optically forming a pattern, comprising exposing pattern-wise

a structure for pattern formation comprising: a substrate; a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a silicone compound, an organic group bonded to a silicon atom of the silicone compound capable of being replaced with an oxygen-containing group through photocatalytic action, thereby varying wettability,

to vary the wettability of the surface of the structure.

97. (New) A method for pattern formation adapted for optically forming a pattern, comprising exposing pattern-wise

a structure for pattern formation comprising: a substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a silicone compound, an organic group bonded to a silicon atom of the silicone compound capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability,

to vary the wettability of the surface of the structure.

98. (New) A method for pattern formation adapted for optically forming a pattern, comprising exposing pattern-wise

a structure for pattern formation comprising: a substrate; and a composition layer provided on the substrate, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder,

to vary the wettability of the surface of the structure through photocatalytic action.

99. (New) A method according to claim 96, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

100. (New) A method according to claim 97, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

101. (New) The method for pattern formation according to claim 96, characterized in that the pattern-wise exposure of the photocatalyst-containing layer is carried out by light beam exposure.

102. (New) The method for pattern formation according to claim 96, characterized in that the pattern-wise exposure of the photocatalyst-containing layer is carried out by exposure through a photomask.

103. (New) The method for pattern formation according to claim 96, characterized in that the pattern-wise exposure of the photocatalyst-containing layer is carried out while heating the structure for pattern formation.

104. (New) An element comprising: a substrate; a structure for pattern formation adapted for optically forming a pattern,

comprising a photocatalyst-containing layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure provided on the substrate; and a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

105. (New) An element comprising: a substrate; a structure for pattern formation adapted for optically forming a pattern, comprising a photocatalyst-containing layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability provided on the substrate; and a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

106. (New) An element comprising: a substrate; a structure for pattern formation adapted for optically forming a pattern,



comprising a photocatalyst-containing layer provided on the substrate and, provided on the photocatalyst-containing layer, a layer that is decomposable and removable through photocatalytic action upon pattern-wise exposure; and a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

107. (New) An element comprising: a substrate; a structure for pattern formation adapted for optically forming a pattern, comprising a photocatalyst-containing layer provided on the substrate and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure ; and a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

108. (New) An element comprising: a substrate; a structure for pattern formation adapted for optically forming a pattern, comprising a photocatalyst-containing layer provided on the

substrate and, provided on the photocatalyst-containing layer, a layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability; and a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

109. (New) An element comprising: a substrate; a structure for pattern formation adapted for optically forming a pattern, comprising a composition layer, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder provided on the substrate; and a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

110. (New) The element according to claim 105, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

111. (New) The element according to claim 108, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

112. (New) The element according to claim 104 wherein the functional layer is a metal film.

113. (New) An element being produced by transferring a functional layer onto another substrate, the functional layer being provided on a structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure according to claim 82.

114. (New) A process for producing an element, comprising the steps of: providing a structure for pattern formation adapted for optically forming a pattern, comprising a photocatalyst-containing layer containing a material of which the wettability is variable

through photocatalytic action upon pattern-wise exposure on the substrate; and forming a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

115. (New) A process for producing an element, comprising the steps of: providing a structure for pattern formation adapted for optically forming a pattern, comprising a photocatalyst-containing layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability on the substrate; and forming a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

116. (New) A process for producing an element, comprising the steps of: providing a structure for pattern formation adapted for optically forming a pattern, comprising a photocatalyst-containing

layer provided on the substrate and, provided on the photocatalyst-containing layer, a layer that is decomposable and removable through photocatalytic action upon pattern-wise exposure; and forming a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

117. (New) A process for producing an element, comprising the steps of: providing a structure for pattern formation adapted for optically forming a pattern, comprising a photocatalyst-containing layer provided on the substrate and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure; and forming a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

118. (New) A process for producing an element, comprising the steps of: providing a structure for pattern formation adapted for optically forming a pattern, comprising a photocatalyst-containing

layer provided on the substrate and, provided on the photocatalyst-containing layer, a layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability; and forming a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

119. (New) A process for producing an element, comprising the steps of: providing a structure for pattern formation adapted for optically forming a pattern, comprising a composition layer, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder on a substrate; and forming a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure.

120. (New) The process according to claim 115, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

121. (New) The process according to claim 118, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

122. (New) A process for producing an element, comprising the step of transferring a functional layer onto a substrate, the functional layer being provided on the structure for pattern formation according to claim 82 in its areas corresponding to a pattern of the structure for pattern formation, whereby the functional layer is formed on the substrate for transfer.

123. (New) The process for producing an element according to claim 114, comprising the steps of: forming a composition for a functional layer onto the whole surface of a structure for pattern formation; and forming a patterned functional layer on the structure for pattern formation only in its wettability-varied exposed areas by utilizing the repellency of unexposed areas.

124. (New) The process for producing an element according to claim 114, comprising the steps of: forming a composition for a functional layer onto the whole surface of a structure for pattern formation; and removing the functional layer in its unexposed areas to form a patterned functional layer.

125. (New) The process for producing an element according to claim 122, comprising the steps of: forming a composition for a functional layer onto the whole surface of a structure for pattern formation; and forming a patterned functional layer on the structure for pattern formation only in its wettability-varied exposed areas by utilizing the repellency of unexposed areas.

126. The process for producing an element according to claim 122, comprising the steps of: forming a composition for a functional layer onto the whole surface of a structure for pattern formation; and removing the functional layer in its unexposed areas to form a patterned functional layer.

127. (New) The process for producing an element according to claim 123, characterized in that the functional layer is formed on



the structure for pattern formation by coating a composition for a functional layer.

128. (New) The process for producing an element according to claim 124, characterized in that the functional layer is formed on the structure for pattern formation by coating a composition for a functional layer.

129. (New) The process for producing an element according to claim 125, characterized in that the functional layer is formed on the structure for pattern formation by coating a composition for a functional layer.

130. (New) The process for producing an element according to claim 126, characterized in that the functional layer is formed on the structure for pattern formation by coating a composition for a functional layer.

131. (New) The process for producing an element according to claim 123 , characterized in that the functional layer is formed on

the structure for pattern formation by ejecting a composition for a functional layer through a nozzle.

132. (New) The process for producing an element according to claim 124 , characterized in that the functional layer is formed on the structure for pattern formation by ejecting a composition for a functional layer through a nozzle.

133. (New) The process for producing an element according to claim 125 , characterized in that the functional layer is formed on the structure for pattern formation by ejecting a composition for a functional layer through a nozzle.

134. (New) The process for producing an element according to claim 126 , characterized in that the functional layer is formed on the structure for pattern formation by ejecting a composition for a functional layer through a nozzle.

135. (New) The process for producing an element according to claim 123, characterized in that the functional layer is formed on

the structure for pattern formation by thermal or pressure transfer from a film coated with a composition for a functional layer.

136. (New) The process for producing an element according to claim 124, characterized in that the functional layer is formed on the structure for pattern formation by thermal or pressure transfer from a film coated with a composition for a functional layer.

137. (New) The process for producing an element according to claim 125, characterized in that the functional layer is formed on the structure for pattern formation by thermal or pressure transfer from a film coated with a composition for a functional layer.

138. (New) The process for producing an element according to claim 126, characterized in that the functional layer is formed on the structure for pattern formation by thermal or pressure transfer from a film coated with a composition for a functional layer.

139. (New) The process for producing an element according to claim 123, characterized in that the functional layer is formed on

the structure for pattern formation by film formation utilizing vacuum.

140. (New) The process for producing an element according to claim 124, characterized in that the functional layer is formed on the structure for pattern formation by film formation utilizing vacuum.

141. (New) The process for producing an element according to claim 125, characterized in that the functional layer is formed on the structure for pattern formation by film formation utilizing vacuum.

142. (New) The process for producing an element according to claim 126, characterized in that the functional layer is formed on the structure for pattern formation by film formation utilizing vacuum.

143. (New) The process for producing an element according to claim 123, characterized in that the functional layer is formed on

the structure for pattern formation by film formation utilizing electroless plating.

144. (New) The process for producing an element according to claim 124, characterized in that the functional layer is formed on the structure for pattern formation by film formation utilizing electroless plating.

145. (New) The process for producing an element according to claim 125, characterized in that the functional layer is formed on the structure for pattern formation by film formation utilizing electroless plating.

146. (New) The process for producing an element according to claim 126, characterized in that the functional layer is formed on the structure for pattern formation by film formation utilizing electroless plating.

147. (New) A color filter comprising: a transparent substrate; a colored layer provided on the transparent substrate, the colored layer comprising a plurality of colors formed in a predetermined

pattern; and a light shielding layer located at each boundary region between two adjacent colored layers, at least one of the colored layer and the light shielding layer having been formed on the transparent substrate through a wettability-variable component layer in its areas having specific wettability.

148. (New) A color filter comprising: a transparent substrate; a colored layer provided on the transparent substrate, the colored layer comprising a plurality of colors formed in a predetermined pattern; and a light shielding layer located at each boundary region between two adjacent colored layers, at least one of the colored layer and the light shielding layer having been formed on the transparent substrate through a wettability-variable component layer in its areas having specific wettability, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

149. (New) A color filter comprising: a transparent substrate; a colored layer provided on the transparent substrate, the colored layer comprising a plurality of colors formed in a predetermined pattern; and a light shielding layer located at each boundary region between two adjacent colored layers, at least one of the colored layer and the light shielding layer having been formed on the transparent substrate through a wettability-variable component layer in its areas having specific wettability, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

150. (New) A color filter comprising: a transparent substrate; a colored layer provided on the transparent substrate, the colored layer comprising a plurality of colors formed in a predetermined pattern; and a light shielding layer located at each boundary

region between two adjacent colored layers, at least one of the colored layer and the light shielding layer having been formed on the transparent substrate through a wettability-variable component layer in its areas having specific wettability, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer that is decomposable and removable through photocatalytic action upon pattern-wise exposure.

151. (New) A color filter comprising: a transparent substrate; a colored layer provided on the transparent substrate, the colored layer comprising a plurality of colors formed in a predetermined pattern; and a light shielding layer located at each boundary region between two adjacent colored layers, at least one of the colored layer and the light shielding layer having been formed on the transparent substrate through a wettability-variable component layer in its areas having specific wettability, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises:



the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

152. (New) A color filter comprising: a transparent substrate; a colored layer provided on the transparent substrate, the colored layer comprising a plurality of colors formed in a predetermined pattern; and a light shielding layer located at each boundary region between two adjacent colored layers, at least one of the colored layer and the light shielding layer having been formed on the transparent substrate through a wettability-variable component layer in its areas having specific wettability, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through

photocatalytic action upon pattern-wise exposure, thereby varying wettability.

153. (New) A color filter comprising: a transparent substrate; a colored layer provided on the transparent substrate, the colored layer comprising a plurality of colors formed in a predetermined pattern; and a light shielding layer located at each boundary region between two adjacent colored layers, at least one of the colored layer and the light shielding layer having been formed on the transparent substrate through a wettability-variable component layer in its areas having specific wettability, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises a composition layer, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder.

154. (New) A color filter according to claim 149, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

155. (New) A color filter according to claim 152, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

156. (New) A color filter comprising: a transparent substrate provided with a light shielding layer in a predetermined pattern; laminates, in a number of desired colors, put on the transparent substrate so as to cover the light shielding layer, the laminates each comprising a wettability-variable component layer and a colored layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability, the light shielding layer being located at each boundary region between two adjacent colored layers.

157. (New) A color filter comprising: a transparent substrate provided with a light shielding layer in a predetermined pattern; laminates, in a number of desired colors, put on the transparent substrate so as to cover the light shielding layer, the laminates each comprising a wettability-variable component layer and a colored layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific

wettability, the light shielding layer being located at each boundary region between two adjacent colored layers, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

158. (New) A color filter comprising: a transparent substrate provided with a light shielding layer in a predetermined pattern; laminates, in a number of desired colors, put on the transparent substrate so as to cover the light shielding layer, the laminates each comprising a wettability-variable component layer and a colored layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability, the light shielding layer being located at each boundary region between two adjacent colored layers, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises a photocatalyst-containing layer provided on the substrate, the

photocatalyst-containing layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

159. (New) A color filter comprising: a transparent substrate provided with a light shielding layer in a predetermined pattern; laminates, in a number of desired colors, put on the transparent substrate so as to cover the light shielding layer, the laminates each comprising a wettability-variable component layer and a colored layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability, the light shielding layer being located at each boundary region between two adjacent colored layers, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer that is decomposable and removable through photocatalytic action upon pattern-wise exposure.

160. (New) A color filter comprising: a transparent substrate provided with a light shielding layer in a predetermined pattern; laminates, in a number of desired colors, put on the transparent substrate so as to cover the light shielding layer, the laminates each comprising a wettability-variable component layer and a colored layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability, the light shielding layer being located at each boundary region between two adjacent colored layers, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

161. (New) A color filter comprising: a transparent substrate provided with a light shielding layer in a predetermined pattern; laminates, in a number of desired colors, put on the transparent substrate so as to cover the light shielding layer, the laminates each comprising a wettability-variable component layer and a

colored layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability, the light shielding layer being located at each boundary region between two adjacent colored layers, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

162. (New) A color filter comprising: a transparent substrate provided with a light shielding layer in a predetermined pattern; laminates, in a number of desired colors, put on the transparent substrate so as to cover the light shielding layer, the laminates each comprising a wettability-variable component layer and a colored layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific

wettability, the light shielding layer being located at each boundary region between two adjacent colored layers, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises a composition layer, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder.

163. (New) A color filter according to claim 158, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

164. (New) A color filter according to claim 161, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

165. (New) A color filter according to claim 147, characterized in that the areas having specific wettability are areas having high critical surface tension.



166. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate and depositing a coating for a light shielding layer onto the areas having specific wettability to form a light shielding layer; and

a second step of forming areas having specific wettability in a predetermined pattern on the transparent substrate and depositing a coating for a colored layer onto the areas having specific wettability to form a colored layer.

167. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate and depositing a coating for a light shielding layer onto the areas having specific wettability to form a light shielding layer; and

a second step of forming areas having specific wettability in a predetermined pattern on the transparent substrate and depositing a coating for a colored layer onto the areas having specific wettability to form a colored layer, wherein the areas having specific wettability are formed on a structure for pattern

formation adapted for optically forming a pattern and comprise a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

168. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate and depositing a coating for a light shielding layer onto the areas having specific wettability to form a light shielding layer; and

a second step of forming areas having specific wettability in a predetermined pattern on the transparent substrate and depositing a coating for a colored layer onto the areas having specific wettability to form a colored layer, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an

oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

169. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate and depositing a coating for a light shielding layer onto the areas having specific wettability to form a light shielding layer; and

a second step of forming areas having specific wettability in a predetermined pattern on the transparent substrate and depositing a coating for a colored layer onto the areas having specific wettability to form a colored layer, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer that is decomposable and removable through photocatalytic action upon pattern-wise exposure.

170. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate and depositing a coating for a light shielding layer onto the areas having specific wettability to form a light shielding layer; and

a second step of forming areas having specific wettability in a predetermined pattern on the transparent substrate and depositing a coating for a colored layer onto the areas having specific wettability to form a colored layer, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

171. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate and depositing a coating for a light shielding layer onto the areas having specific wettability to form a light shielding layer; and

a second step of forming areas having specific wettability in a predetermined pattern on the transparent substrate and depositing a coating for a colored layer onto the areas having specific wettability to form a colored layer, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

172. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate and depositing a coating for a light shielding layer onto the areas having specific wettability to form a light shielding layer; and

a second step of forming areas having specific wettability in a predetermined pattern on the transparent substrate and depositing

a coating for a colored layer onto the areas having specific wettability to form a colored layer, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise a composition layer, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder.

173. (New) A process according to claim 168, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

174. (New) A process according to claim 171, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

175. (New) A process for producing a color filter comprising:  
a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate provided with a light shielding layer of a predetermined pattern; and

a second step of depositing a coating for a colored layer onto the wettable areas to form a colored layer.

176. (New) A process for producing a color filter comprising:  
a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate provided with a light shielding layer of a predetermined pattern; and

a second step of depositing a coating for a colored layer onto the wettable areas to form a colored layer,

the wettable areas being formed on a surface of a wettability-variable component layer, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern, and comprises a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

177. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate provided with a light shielding layer of a predetermined pattern; and

a second step of depositing a coating for a colored layer onto the wettable areas to form a colored layer,

the wettable areas being formed on a surface of a wettability-variable component layer, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

178. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate provided with a light shielding layer of a predetermined pattern; and



a second step of depositing a coating for a colored layer onto the wettable areas to form a colored layer,

the wettable areas being formed on a surface of a wettability-variable component layer, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer that is decomposable and removable through photocatalytic action upon pattern-wise exposure.

179. (New) A process for producing a color filter, comprising:  
a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate provided with a light shielding layer of a predetermined pattern; and

a second step of depositing a coating for a colored layer onto the wettable areas to form a colored layer,

the wettable areas being formed on a surface of a wettability-variable component layer, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a

photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

180. (New) A process for producing a color filter, comprising:  
a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate provided with a light shielding layer of a predetermined pattern; and

a second step of depositing a coating for a colored layer onto the wettable areas to form a colored layer,

the wettable areas being formed on a surface of a wettability-variable component layer, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

181. (New) A process for producing a color filter, comprising:

a first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate provided with a light shielding layer of a predetermined pattern; and

a second step of depositing a coating for a colored layer onto the wettable areas to form a colored layer,

the wettable areas being formed on a surface of a wettability-variable component layer, wherein the wettability-variable component layer is a structure for pattern formation adapted for optically forming a pattern and comprises a composition layer, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder.

182. (New) A process for producing a color filter according to claim 177, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

183. (New) A process for producing a color filter according to claim 180, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

184. (New) The process for producing a color filter according to claim 175, characterized in that, in the first step, a photocatalyst-containing layer comprising at least a binder and a photocatalyst is formed on the transparent substrate provided with the light shielding layer of a predetermined pattern so as to cover the light shielding layer and is then irradiated with light to permit light exposed areas to have high critical surface tension through photocatalytic action, thereby forming the areas having specific wettability.

185. (New) A process for producing a color filter, comprising repeating a procedure for forming areas having specific wettability in a predetermined pattern on a transparent substrate, provided with a light shielding layer of a predetermined pattern, and depositing a coating composition for a colored layer onto the areas having specific wettability to form a colored layer as many times as required to form a necessary number of colored layers of a plurality of colors.

186. (New) A process for producing a color filter, comprising repeating a procedure for forming areas having specific wettability

in a predetermined pattern on a transparent substrate, provided with a light shielding layer of a predetermined pattern, and depositing a coating composition for a colored layer onto the areas having specific wettability to form a colored layer as many times as required to form a necessary number of colored layers of a plurality of colors, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

187. (New) A process for producing a color filter, comprising repeating a procedure for forming areas having specific wettability in a predetermined pattern on a transparent substrate, provided with a light shielding layer of a predetermined pattern, and depositing a coating composition for a colored layer onto the areas having specific wettability to form a colored layer as many times as required to form a necessary number of colored layers of a plurality of colors, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for

optically forming a pattern and comprise a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

188. (New) A process for producing a color filter, comprising repeating a procedure for forming areas having specific wettability in a predetermined pattern on a transparent substrate, provided with a light shielding layer of a predetermined pattern, and depositing a coating composition for a colored layer onto the areas having specific wettability to form a colored layer as many times as required to form a necessary number of colored layers of a plurality of colors, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer that is

decomposable and removable through photocatalytic action upon pattern-wise exposure.

189. (New) A process for producing a color filter, comprising repeating a procedure for forming areas having specific wettability in a predetermined pattern on a transparent substrate, provided with a light shielding layer of a predetermined pattern, and depositing a coating composition for a colored layer onto the areas having specific wettability to form a colored layer as many times as required to form a necessary number of colored layers of a plurality of colors, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

190. (New) A process for producing a color filter, comprising repeating a procedure for forming areas having specific wettability in a predetermined pattern on a transparent substrate, provided

with a light shielding layer of a predetermined pattern, and depositing a coating composition for a colored layer onto the areas having specific wettability to form a colored layer as many times as required to form a necessary number of colored layers of a plurality of colors, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

191. (New) A process for producing a color filter, comprising repeating a procedure for forming areas having specific wettability in a predetermined pattern on a transparent substrate, provided with a light shielding layer of a predetermined pattern, and depositing a coating composition for a colored layer onto the areas having specific wettability to form a colored layer as many times as required to form a necessary number of colored layers of a



plurality of colors, wherein the areas having specific wettability are formed on a structure for pattern formation adapted for optically forming a pattern and comprise a composition layer, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder.

192. (New) A process according to claim 187, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

193. (New) A process according to claim 190, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

194. (New) The process for producing a color filter according to claim 167, characterized in that exposure of the photocatalyst-containing layer to light is carried out by any one of pattern-wise exposure through a mask and a light beam exposure.

195. (New) The process for producing a color filter according to claim 166, characterized in that the deposition of the coating composition for a light shielding layer and/or the coating for a colored layer is carried out by any one of a coating method, a nozzle ejection method, and a vacuum thin film formation method.

196. (New) The process for producing a color filter according to claim 195, characterized in that, in the vacuum thin film formation method, after the formation of a thin film, the thin film formed of a coating for a light shielding layer or a coating for a colored layer deposited on areas other than the areas having specific wettability is removed.

197. (New) A process for producing a lens, comprising the steps of:

forming a pattern based on a difference in wettability on the surface of a substrate;

depositing a liquid containing a material for a lens on areas having specific wettability of the surface of the substrate; and

curing the liquid containing the material for a lens to form a lens, wherein the pattern based on a difference in wettability is

a structure for pattern formation adapted for optically forming a pattern and comprises a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure

198. (New) A process for producing a lens, comprising the steps of:

forming a pattern based on a difference in wettability on the surface of a substrate;

depositing a liquid containing a material for a lens on areas having specific wettability of the surface of the substrate; and

curing the liquid containing the material for a lens to form a lens, wherein the pattern based on a difference in wettability is a structure for pattern formation adapted for optically forming a pattern and comprises a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a silicone compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

199. (New) A process for producing a lens, comprising the steps of:

forming a pattern based on a difference in wettability on the surface of a substrate;

depositing a liquid containing a material for a lens on areas having specific wettability of the surface of the substrate; and

curing the liquid containing the material for a lens to form a lens, wherein the pattern based on a difference in wettability is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer that is decomposable and removable through photocatalytic action upon pattern-wise exposure.

200. (New) A process for producing a lens, comprising the steps of:

forming a pattern based on a difference in wettability on the surface of a substrate;

depositing a liquid containing a material for a lens on areas having specific wettability of the surface of the substrate; and

2025-10-10 14:00:00

curing the liquid containing the material for a lens to form a lens, wherein the pattern based on a difference in wettability is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

201. (New) A process for producing a lens, comprising the steps of:

forming a pattern based on a difference in wettability on the surface of a substrate;

depositing a liquid containing a material for a lens on areas having specific wettability of the surface of the substrate; and

curing the liquid containing the material for a lens to form a lens, wherein the pattern based on a difference in wettability is a structure for pattern formation adapted for optically forming a pattern and comprises: the substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a silicone

compound having an organic group bonded to a silicon atom of the silicone compound, said organic group capable of being replaced with an oxygen-containing group through photocatalytic action upon pattern-wise exposure, thereby varying wettability.

202. (New) A process for producing a lens, comprising the steps of:

forming a pattern based on a difference in wettability on the surface of a substrate;

depositing a liquid containing a material for a lens on areas having specific wettability of the surface of the substrate; and

curing the liquid containing the material for a lens to form a lens, wherein the pattern based on a difference in wettability is a structure for pattern formation adapted for optically forming a pattern and comprises a composition layer, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder.

203. (New) A process according to claim 188, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

204. (New) A process according to claim 201, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

205. (New) The process for producing a lens according to claim 197, wherein the substrate is transparent.

206. (New) The process for producing a lens according to claim 197, wherein the lens is a microlens.

207. (New) The process for producing a lens according to claim 206, wherein a plurality of the microlenses are regularly disposed to provide a microlens array.

208. (New) The process for producing a lens according to claim 206, wherein the lenses are colored a single color or a plurality of colors.

209. (New) The process for producing a lens according to claim 207, wherein a plurality of the microlenses, which have been

colored a plurality of specific colors, are regularly disposed to provide a color microlens array.

210. (New) The process for producing a lens according to claim 197, wherein the liquid containing a material for the lens is deposited onto the substrate in its areas of which the wettability has been varied upon exposure to light.

211. (New) The process for producing a lens according to claim 197, wherein the liquid containing a material for the lens is deposited onto the substrate in areas of which the wettability has remained unvaried due to not being exposed to light.

212. (New) The process for producing a lens according to claim 197, wherein the liquid containing a material for the lens is deposited onto the substrate by coating.

213. (New) The process for producing a lens according to claim 197, wherein the liquid containing a material for the lens is deposited onto the substrate by ejection through a nozzle.



214. (New) The process for producing a lens according to claim 197, wherein the liquid containing a material for the color lens is deposited onto the substrate by ejection through nozzles respectively for necessary colors to provide a color microlens.

215. (New) The process for producing a lens according to claim 197, wherein, with respect to one substrate, the steps are repeated for each color of the lens to provide an array of color microlenses of a plurality of colors.

216. (New) The process for producing a lens according to claim 197, wherein the amount of the liquid containing a material for the lens deposited onto the substrate is varied to regulate the focal length of the lens.

REMARKS

This application is a Rule 1.53(b) continuation application of U.S. Serial No. 09/284,161, filed April 8, 1999, now allowed.

Claims 82 to 216 are pending herein. Claims 1 to 81 have been canceled without prejudice or disclaimer. Claims 82 to 216 are directed to embodiments different from the subject matter allowed in the parent case.

The specification has been amended to identify the parent application.

Filed herewith is an Information Disclosure Statement listing all references cited during prosecution of the parent application.

Prompt and favorable examination of this application on the merits is respectfully solicited.

Respectfully submitted,

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